INSTRUCTION MANUAL

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INTRODUCTION

The PORTMAKER is a dual serial I/O board that provides its host computer with the interface capabilities necessary to communicate with most 'RS232 type' serial devices. Based on the 6850 ACIA circuit, PORTMAKER interfaces to modems, printers, real time clocks, data acquisition systems, and even other computers.

PORTMAKER will plug into a 2532 type ROM socket and stand vertically in the socket. (An optional horizontal mount is available.) Two control wires with miniclips provide timing and read/write control to Portmaker.

Each serial port provides a 16 pin DIP socket for I/O connections. A mass terminated flat cable properly connects to a 'DB25' type connector. Each serial port has buffered handshake control lines and wire jumpers to allow special I/O configurations. The standard PORTMAKER board provides TTL level signals sufficient to drive most RS232 devices. PORTMAKER can be simply modified to provide bipolar RS232 levels if necessary. (See RS232 Modification Section.)

COMPACK is a complete communications package which includes a special assembly of PORTMAKER, the STCP software from Eastern House and a cable to connect Portmaker to your modem. This special Portmaker is all set up ready to go and is specially modified to operate with the STCP software. A standard Portmaker will not operate with STCP.

INSTALLATION

Commodore Pet/CBM

1.Remove the two screws from the left and right lower sides of the top case.
2.Carefully lift the top case. A black prop rod sits in the front of the lower case. Lift the prop and use it to hold open the top.
3.Plug the Portmaker board into the desired ROM socket. In small screen machines with the 9 inch CRTs, the board plugs into socket UD4 for use with STCP software. Refer to Fig. 1. The board is installed with the component side of the board facing right. In large screen machines with 12 inch CRTs, the board is installed in socket UD11 for use with STCP software. Refer to Fig. 2. The board is installed with the component side facing forward.
BE CAREFUL to orient the board properly. Make certain that pin 1 of Portmaker mates with pin 1 of the socket. Improper orientation can destroy Portmaker as well as the Pet/CBM. If you are not sure about board orientation, STOP. Call your dealer. Do not 'try it out'!!
4.Connect the green wire (Read/Write) to Pet connector J9 pin 22. Refer to Fig. 1 or 2. It connects to the inside row of pins.
5.Connect the yellow wire (Phase 2 clock) to Pet connector J9 pin 21. Refer to Fig. 1 or 2. Again, connect to the inside row.
6.Connect the orange wire (IRQ), if present, to Pet connector J9 pin 19.
7.If your Portmaker board is modified for bipolar RS232 operation, please consult the section on 'RS232 Modification' for installation of the read and blue wires.
8.Plug your serial cable into the Portmaker socket. Be sure orient pin 1 of the plug to pin 1 of the socket.
9.Plug the 25 pin DB25 connector into your modem or serial device.
NOTE: If you normally use a ROM in the socket now occupied by Portmaker, this ROM can be inserted into socket U5 of Portmaker. Be sure to orient pin 1 of the ROM correctly. The ROM will operate exactly as before except that the top 16 bytes of the ROM are replaced by the ACIAs of Portmaker. This should not cause a problem is most ROMs.

ROCKWELL AIM

1.Plug the Portmaker into the desired ROM socket. The Portmaker board will operate in sockets Z24, Z25, or Z26.
2.Connect the green wire (Read/Write) to Z16 (7404) pin 6.
3.Connect the yellow wire (Phase two clock) to Z16 pin 10.
4.Follow steps 7, 8 and 9 above.

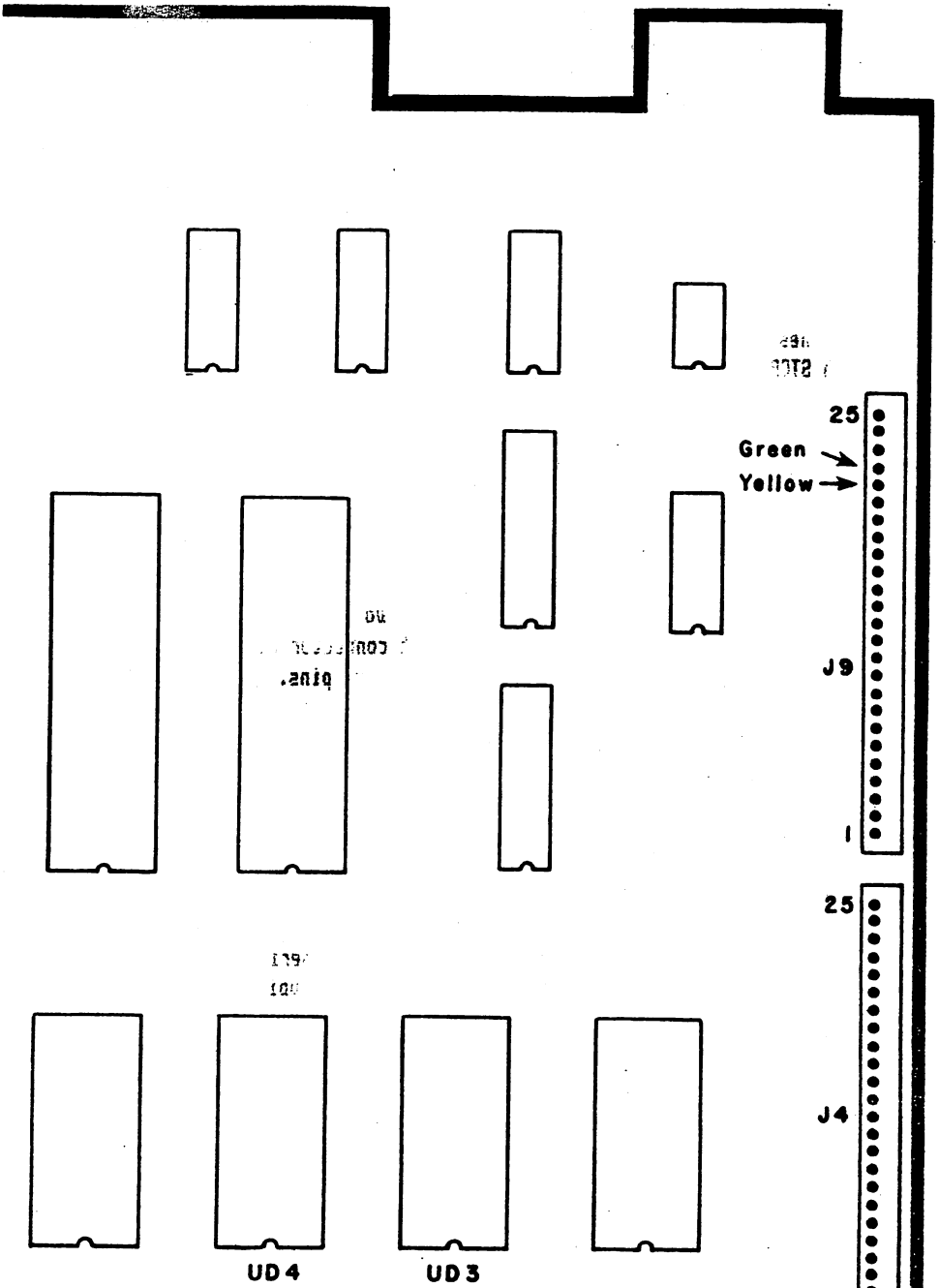


FIG. 1 MAIN LOGIC BOARD - 9'CRT

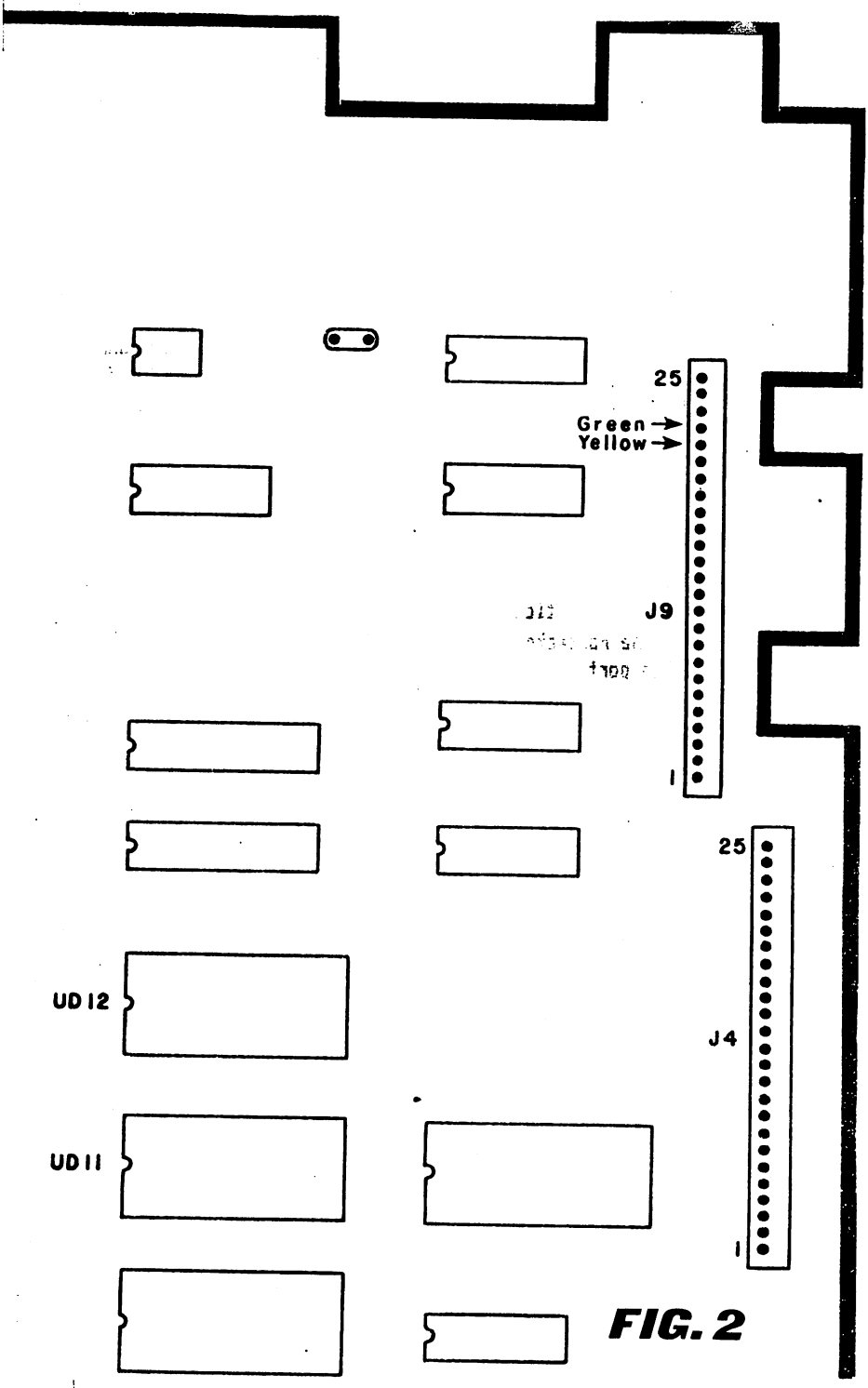


FIG. 2

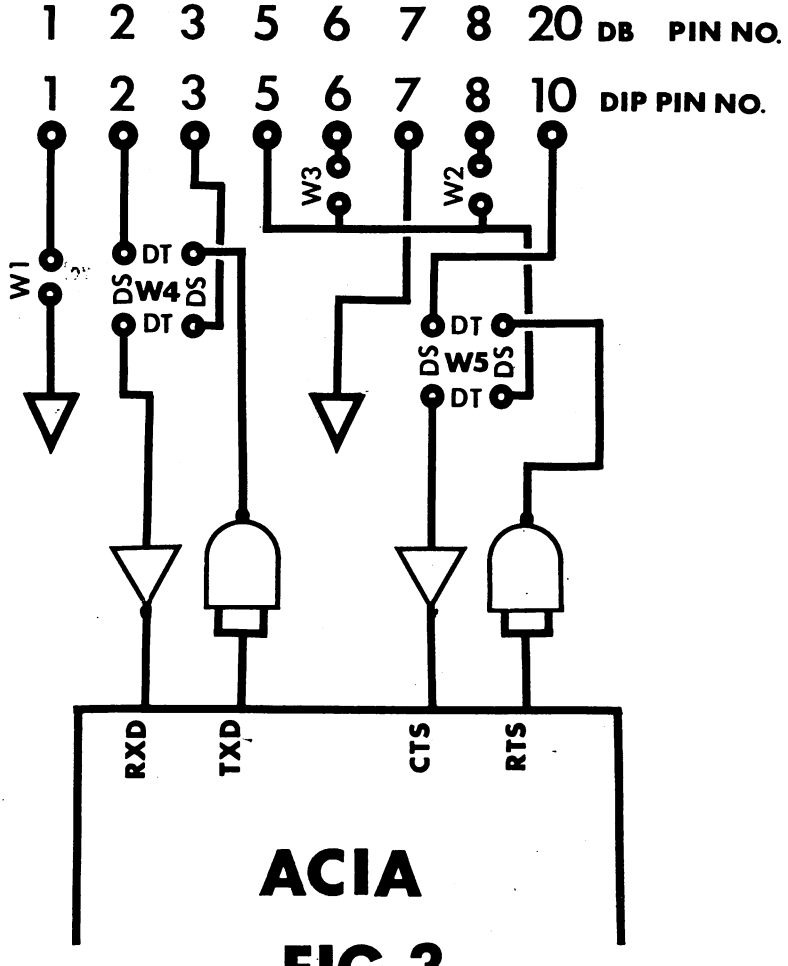
RS232 CONNECTION

The Electronic Industries Association established the RS232 standard to define a connector type, voltage levels, connector pinout, and logical function of each connection. The standard however defines many signals that are not necessary for most applications. Much equipment does not impliment the entire standard and some care should be taken to insure that the requirements of the peripheral equipment are met. The standard defines two types of devices, a DATA TERMINAL and a DATA SET. The DATA TERMINAL is the equivalent of a normal CRT terminal. The DATA SET is the equivalent of a computer. Of course, a DATA SET will plug directly into a DATA TERMINAL and they can talk to each other. But do not try to plug a DATA TERMINAL into a DATA TERMINAL because they both try to talk (output data) on the same wire.

Portmaker can be jumpered to provide signals to various pins on the RS232 25 pin connector. An electrical diagram of port J1 is shown in Fig. 3. Port J2 is identical except for jumper numbers. Jumper wires are built into the Portmaker board to configure Portmaker as a standard DATA TERMINAL on port J1 and a standard DATA SET on port J2. With the standard jumper configuration, Portmaker implments the following signals:

PORT J1-PIN 1 No connection (W1 out)
PIN 2 Output-transmit data (W4 has two wires in the DT position)
PIN 3 Input -receive data
PIN 4 No connection
PIN 5 Input -clear to send. This signal is pulled to +5 volts through a resistor on the Portmaker board so that no connection is required.
PIN 6 No connection (W3 out)
PIN 7 Common
PIN 8 No connection (W4 out)
PIN 9 No connection
PIN 10 Output-ready to send (W5 has two wires in DT position)
PIN 11-16 No connection

These pin numbers refer to the DIP socket pin numbers. DB25 pin numbers are shown in Fig.3.


1 2 3 5 6 7 8 20 DB PIN NO.
1 2 3 5 6 7 8 10 DIP PIN NO.
W1
W3
W2
DT
DS
W4
DS
DT
DT
DS
W5
DS
DT
RXD
TXD
CTS
RTS

ACIA

FIG.3

PORT J2-PIN 1 No connection
PIN 2 Input -receive data
PIN 3 Output-transmit data
PIN 4 No connection
PIN 5 Output-ready to send
PIN 6 No connection
PIN 7 Common
PIN 8 No connection
PIN 9 No connection
PIN 10 Input -clear to send. This signal is pulled to +5 volts on the Portmaker board so that no connection is required.
PIN 11-16 No connection

These pin numbers refer to the DIP socket pin numbers. DB25 pin numbers are shown in Fig.3.

Portmaker does not provide the voltage levels as defined by the RS232 standard. Portmaker provides TTL levels: 2.5 volts. Most serial devices accept either TTL or bipolar RS232. If your device will not accept TTL, Portmaker can be modified. See the section on RS232 MODIFICATION.

CUSTOM CONFIGURATION SET UP

Several jumper pads are available on the Portmaker board in order to accomodate various serial device requirements. A standard jumper arrangement is factory installed in copper traces on the p.c. board as indicated. Refer to Fig.3.

PORT J1

W1: connects signal ground to chassis ground. It is not connected with a copper trace on the board.

W2: connects J1 pin 8 to pin 5. It is used when the port is configured as a DATA SET(DS) to generate 'Carrier Detect', an output. It is not connected with a copper trace on the board.

W3: connects J1 pin 6 to pin 5. It is used when the port is configured as a DS to generate the 'Data Set Ready' signal. It is not connected with a copper trace on the board.

W4: is used to set port J1 as either a DATA SET or a DATA TERMINAL. Two horizontal jumpers create a DATA TERMINAL. Two vertical jumpers create a DATA SET. This is accomplished by reversing the transmit data and receive data lines. W4 is normally factory set as a DATA TERMINAL with copper jumpers in the p.c. board.

W5: is used to set port J1 control lines as either a DATA SET or a DATA TERMINAL. Two horizontal jumpers create a DATA TERMINAL. Two vertical jumpers create a DATA SET. This is accomplished by reversing the control input and output lines. W5 is normally factory set as a DATA TERMINAL with copper jumpers in the p.c. board.

W11: is used to set the BAUD RATE for J1.

- Position A: 300 or 1200 baud.
- Position B: 600 or 2400 baud.
- Position C: 1200 or 2400 baud.

The rate is factory set at position A with a copper trace on the board. The selection of high(1200) or low(300) rate depends on the ACIA initialization. The baud rate can be software controlled to divide its clock. When the ACIA divider is set to 64, the baud rate will be 300. The STCP software from Eastern House allows the user to select the rate with prompting.

PORT J2

W6: connects J2 pin 8 to pin 5. It is used when the port is configured as a DATA SET(DS) to generate 'Carrier Detect', an output. It is not connected with a copper trace on the board.

W7: connects signal ground to chassis ground. It is not connected with a copper trace on the board.

W8: connects J2 pin 6 to pin 5. It is used when the port is configured as a DS to generate the 'Data Set Ready' signal. It is not connected with a copper trace on the board.

W9: is used to set port J2 as either a DATA SET or a DATA TERMINAL. Two horizontal jumpers create a DATA TERMINAL. Two vertical jumpers create a DATA SET. This is accomplished by reversing the transmit data and receive data lines. W9 is normally factory set as a DATA SET with copper jumpers in the p.c.b. board.

W10:is used to set port J2 control lines as either a DATA SET or a DATA TERMINAL. Two horizontal jumpers create a DATA TERMINAL. Two vertical jumpers create a DATA SET. This is accomplished by reversing the control input and output lines. W10 is normally factory set as a DATA SET with copper traces in the board.

W12: is used to set the BAUD RATE for J2.

Position A: 300 or 1200 baud.
Position B: 600 or 2400 baud.
Position C: 1200 or 2400 baud.

The rate is factory set at position A with a copper trace in the board. The selection of high(1200) or low(300) rate depends on the ACIA initialization. The baud rate can be software controlled to divide its clock. When the ACIA divider is set to 64, the baud rate will be 300.

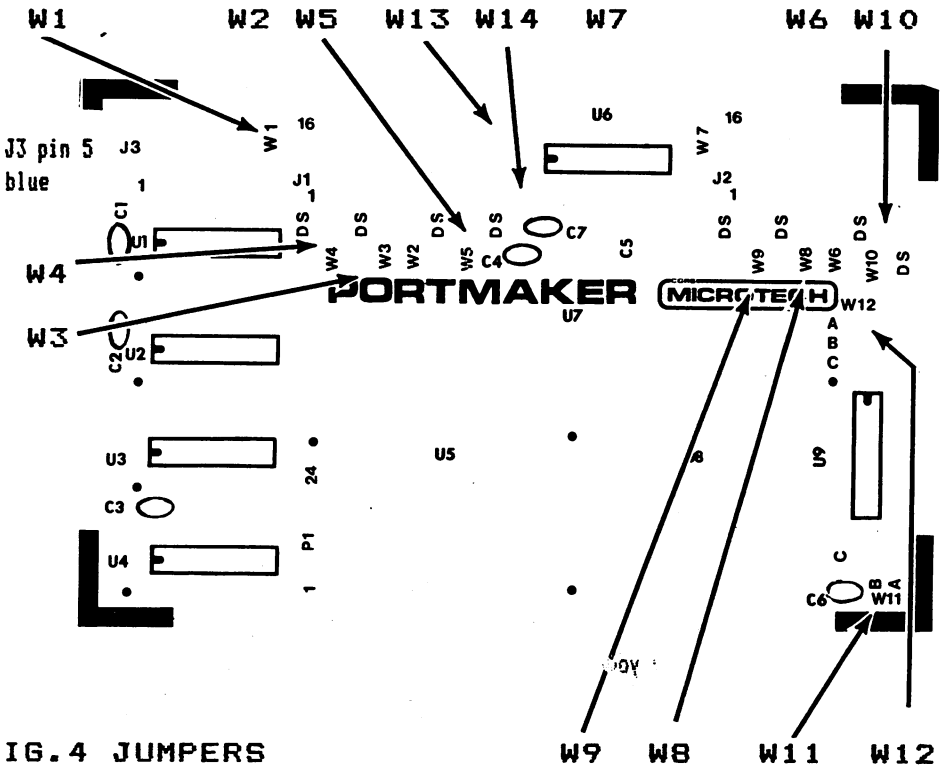


FIG.4 JUMPERS

RS232 MODIFICATION OPTION

The standard Portmaker board can be modified to generate a bipolar (+10,-4) voltage signal which meets the RS232 voltage standard. This is done by cutting two jumpers (if they are installed), adding two wires, and substituting a 1488 RS232 driver chip for the 74LS00 now installed in Portmaker. Use the following steps:

1.Cut copper jumper W13. It is located on the circuit side of the Portmaker p.c. board in copper. See FIG. 5

2.Cut jumper W14. If it is installed, it is wire jumper on the component side of the board.

3.Solder a red wire into the right hole of W13. This will be used to supply +12 volts to pin 14 of U6.

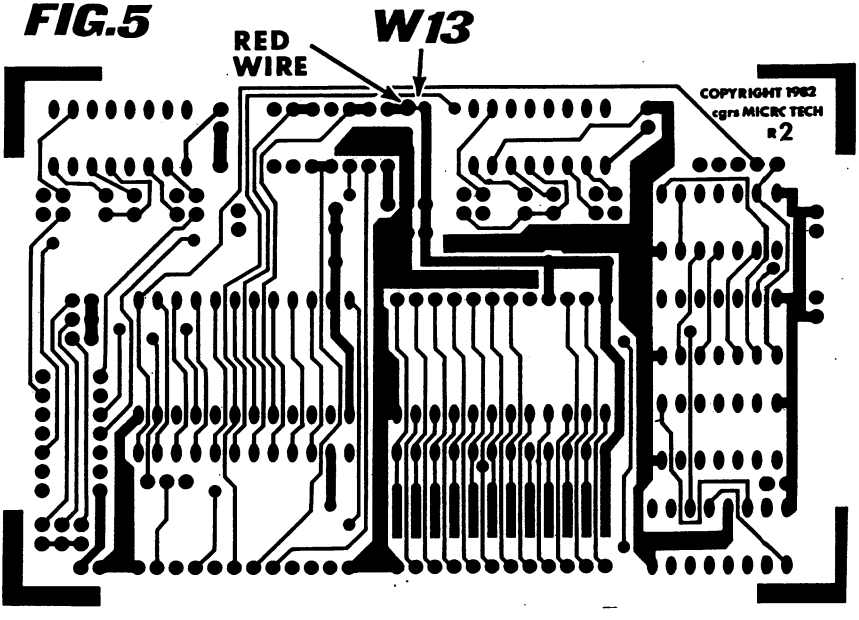
4.Solder a blue wire into the J3 hole pattern at pin 5. This will be used to supply minus 5 volts to pin 1 of U6.

5.Remove the 74LS00 circuit from the U6 socket. Insert a MC1488 circuit into the socket. Be careful to orient pin 1 properly.

BE CAREFUL..

You could destroy your Portmaker and your computer. cgrs MICROTECH will modify any Portmaker for you. Simply send the Portmaker along with a check for $15.00.

FIG.5

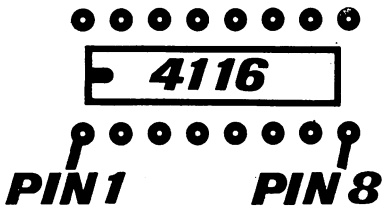


ADDITIONAL INSTALLATION

In addition to the installation done for the standard Portmaker, the following must be done:

1.Connect the red wire to +12 volts at pin 8 of any 4116 RAM chip. Be very careful about this. If you are not absolutely sure, don't do it.

2.Connect the blue wire to -5 volts at pin 1 of any 4116 RAM chip. Again, be very careful about this. If you are not sure, don't do it. Get help from your dealer. A shorted wire can destroy both the Portmaker board and possibly the computer.



MEMORY MAP

The ACIAs of the Portmaker board occupy the highest 16 locations of the ROM socket space where the board is inserted. For example:

```
Commodore socket UD11: $A000 thru $AFFF
            ROM      $A000 thru $AFEF
            ACIA U8 (J1) $AFF0 thru $AFF3
            ACIA U7 (J2) $AFF4 thru $AFF7
            Unoccupied   $AFF8 thru $AFFF

The actual registers are    ACIA U8 Control/Status  $AFF0
                            ACIA U8 Data register   $AFF1

                            ACIA U7 Control/Status  $AFF4
                            ACIA U7 Data register   $AFF5
```

NOTE:This information does not apply to the special assembly Portmaker used in COMPACK.

I/O ROUTINES

ACIA circuits must be initialized and operated via software routines. All these routines are provided with the STCP software package. If you have purchased your Portmaker in the COMPACK package, you do not need to write your own software. If, however, the Portmaker was purchased seperately, you will need to write some special routines to operate the board.

INITIALIZATION

The ACIA must be initialized or 'set up'. This involves writing a byte of data to the 'Control/Status' register. This byte of data determines the baud rate divisor, stop bits, data bits, and interrupt capability. Bits 0 and 1 are used to reset the ACIA and determine the baud rate divisor:

BIT 1	BIT 0	Function
0	0	Divide by 1 - not recommended for Portmaker
0	1	Divide by 16
1	0	Divide by 64
1	1	Master Reset

Bits 2, 3, and 4 are used to set the data bits, stop bits, and parity. A good value to use is:

BIT 4	BIT 3	BIT 2	
1	0	1	8 data bits, 1 stop bit, no parity

Bits 5 and 6 are used for transmitter control and transmit interrupt enable.

BIT 6	BIT 5	
1	0	RTS=high, interrupts disabled

Bit 7 is the receive interrupt enable. A high level will enable interrupts.

Additional information of considerable detail can ba obtained from the Motorola 6850 Data Sheet. It is available for Motorola dealers.

SAMPLE INITIALIZATION ROUTINE

```
ACIASTAT .EQU $AFF0
ACIADATA .EQU $AFF1
      LDA #$03        First reset the acia
      STA ACIASTAT
      LDA #$16        Set up for 64 divide
      STA ACIASTAT
```

INPUT CHARACTER

A sample routine for getting a character from the ACIA is included for reference:

```
IN      LDA ACIASTAT    Check status reg,is character ready?
        AND #$01        Mask unused bits
        BEQ IN          Wait until one is ready
        LDA ACIADATA    Get the character
        RTS             Exit with character in ACCUM
```

OUTPUT CHARACTER

A sample routine for transmitting a character out of the ACIA is oncluded for reference:

```
OUT     LDA ACIASTAT    Check status reg,is buffer available?
        AND #$02        Mask unused bits
        BEQ OUT         Wait until last character is transmitted
        LDA CHARACTER   Get the character to be sent
        STA ACIADATA
        RTS
```